



Dakota Skies

Fall 2001

www.crh.noaa.gov/bis

Calculation of Wind Chill Changes

Starting with the 2001-02 winter, forecasters will use a new Wind Chill Temperature Index, designed to calculate a more accurate reading of how the cold air feels on the human skin.

The new index will be based on:

- Wind speed calculated at the average height of the human face, about five feet (the human face is most often exposed to the cold).
- An updated heat transfer theory, which factors in heat loss from the body to its surroundings during cold, windy days.
- A consistent standard for skin tissue resistance.
- Clear night sky conditions.
- A lowered calm wind threshold from four miles to three miles.

"Exposure to cold, biting air for long periods of time is dangerous," said retired General Jack Kelly, director NOAA's National Weather Service. "Our main goal was to use modern science in revising the index so that it's more accurate and makes the human impact more prominent."

Since 1945, the United States and Canada have used an index, which relied on observed winds 33 feet above the ground, and focused on how fast the cold temperatures—combined with winds—made water freeze. The new index accounts for the wind effects at face level, and a better calculation for body heat loss. For example, under the old index system, an air temperature of 20 degrees, with a 15 mph wind, translated into a reading of five degrees below zero. The new index calculation would translate the same conditions to six degrees above zero. For more information and to compute the old wind chill versus the new wind chill, visit:

<http://www.crh.noaa.gov/bis/newwindchill.htm>

Temperature (°F)

	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite occurs in 15 minutes or less

Wind Chill Warning Criteria Changes

Changes to the calculation of wind chill have prompted changes to wind chill warning and wind chill advisory criteria.

Wind Chill Warning: Issued in North Dakota when wind chill temperatures are expected to 35 to 40 degrees below zero or colder.

Wind Chill Advisory: Issued in North Dakota when wind chill temperatures are expected to be 20 degrees below zero or colder.

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◆ News from the Top ◆

Bismarck MIC Jim Fors

New Way to Make a Forecast Coming

Ever since the National Weather Service began issuing weather forecasts, they have been nothing more than words on a piece of paper. Chances are you heard the forecast when someone read those words to you over radio or TV. Or, perhaps you read the words in a local newspaper. The NWS meteorologist carefully prepared and composed those words based on the wide variety of information at hand. But when all is said and done, the words cannot begin to describe the vast amount of meteorological knowledge that the forecaster has available.

Today, people want more than words. Internet dissemination of NWS products has grown dramatically over the last few years. NWS weather web pages are one of the most frequently visited among government Internet sites. With this internet dissemination, comes the capability to present forecasts in a graphical or geographical format. As they say, a picture is worth a thousand words. Also, the interest in more detailed and specialized weather information continues to grow.

Starting next year, the NWS will begin issuing weather forecasts in two formats. Of course, the traditional worded forecast will still be issued. But also, a gridded forecast will be issued. This means that specific forecast information at 3-hourly intervals will be available for hundreds of points around western and central North Dakota. This detailed information could be as close as the click of your mouse button. As an example, suppose someone wanted to know what the forecast temperature, wind and humidity were going to be at a point between Bismarck and Washburn at 3 pm tomorrow. Or, suppose someone wanted to know how much rain was forecast to fall on their wheat crop during the evening hours. This is the type of information that will be available.

This won't all happen at once, but, expect to see a

few *test* forecast maps on our Internet web page over the next few months.

Free Real-time Radar Data:

<http://www.crh.noaa.gov/radar>



About this Publication

Dakota Skies is published twice a year by the National Weather Service Forecast Office in Bismarck, North Dakota. The purpose of this publication is to relay information on changes to your National Weather Service in North Dakota and to distribute safety information on severe summer and winter weather. Further information can be obtained by sending a request to the address below:

NWS Bismarck
P.O. Box 1016
Bismarck, ND 58502-1016

Phone (8 AM to 5 PM):
(701) 250-4224
Recorded Forecast:
(701) 223-3700

NWS Williston
402 Airport Road
Williston, ND 58801-9802

Phone (8 AM to 5 PM):
(701) 572-3198
Recorded Forecast:
(701) 572-2351

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Why is snow white? Sunlight contains a range of colors (violet, blue, green, etc.) Most natural materials reflect some part of this spectrum, and this gives them their specific color. Snow, however, reflects nearly all sunlight. When a surface reflects all colors contained in visible light, it appears white.

What makes a winter storm

The three ingredients necessary for a winter storm include cold air, moisture, and a lifting mechanism.

Cold air: below freezing temperatures in the clouds and near the ground are necessary to make snow and/or ice.

Moisture: to form clouds and precipitation. Air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.

Lift: something to raise the moist air to form the clouds and cause precipitation. An example of lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of lift is air flowing up a mountain side.

What is a blizzard?

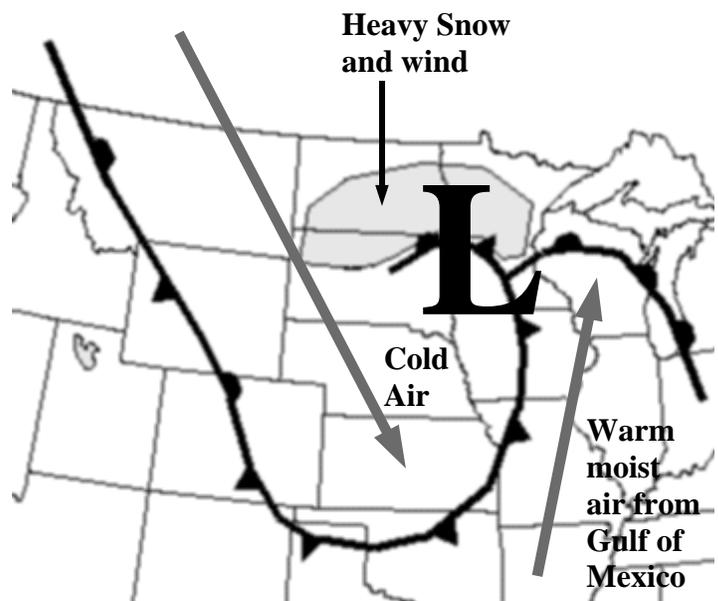
Blizzards are severe winter storms that pack a combination of blowing snow and wind resulting in very low visibilities. While heavy snowfalls and severe cold often accompany blizzards, they are not required. Sometimes strong winds pick up snow that has already fallen, creating a blizzard. Officially, the National Weather Service defines a blizzard as large amounts of falling OR blowing snow with winds in excess of 35 mph and visibilities of less than 1/4 of a mile for an extended period of time (greater than 3 hours). When these conditions are expected, the National Weather Service may issue a "Blizzard Warning". When a less severe, but still dangerous, winter storm is expected a "Winter Storm Watch" or "Winter Storm Warning" may be issued. A "Winter storm Watch" is issued in advance and means that there is the possibility of a winter storm affecting your area. Keep alert and stay tuned to TV, radio, and other sources of weather information. A "Winter Storm Warning" means a winter storm is imminent or already occurring.

What makes blizzards dangerous?

Blizzards can create a variety of dangerous conditions. Traveling by automobile can become difficult or even impossible due to "whiteout"

conditions and drifting snow. If you must drive in a blizzard, be prepared! Make sure your automobile is properly equipped and that you have emergency supplies in case you become stranded or lost.

The strong winds and cold temperatures accompanying blizzards can combine to create another danger. The wind chill factor is the amount of cooling one "feels" due to the combination of wind and temperature. For instance, a strong wind combined with a temperature of just below freezing can have the same effect as a still air temperature about 35 degrees colder. A wind chill chart may be used to estimate the wind chill factor.



In the northern plains, storms with heavy snow and wind tend to develop over southeast Colorado in the lee of the Rockies. These storms move east or northeast and use both the southward plunge of cold air from Canada and the northward flow of moisture from the Gulf of Mexico to produce heavy snow and sometimes blizzard conditions. Other storms affecting the Plains form in the lee of the Canadian Rockies and move southeast (e.g. Alberta Clipper). Arctic air is drawn from the north and moves south across the Plains. Wind and cold sometime combine to cause wind chill temperatures as low as 50°F below zero using the new wind chill chart (70°F below using the old wind chill chart).

Additional information on winter storms can be found at:

<http://www.nws.noaa.gov/om/winter>



Awareness Week

North Dakota Governor John Hoeven is expected to proclaim the week of **November 5 to 9** as Severe Winter Weather Awareness Week! Contact your local County Emergency Manager (CEM) to find out how to better protect your

family and your community. To find the name and phone number of your CEM look in the phone book under County Government, or find them on the Internet at:

<http://www.state.nd.us/dem/manager.html>

Know Your Weather Terms

With Old Man Winter just around the corner, the National Weather Service urges residents to keep abreast of local forecasts and warnings and familiarize themselves with key weather terminology.

Winter Storm Warning: Issued when a combination of heavy snow, heavy freezing rain, or heavy sleet is expected. Winter Storm Warnings are usually issued six to 24 hours before the event is expected to begin.

Winter Storm Watch: Alerts the public to the possibility of a blizzard, heavy snow, freezing rain, or heavy sleet. Winter Storm Watches are usually issued 12 to 36 hours before the beginning of a winter storm.

Winter Storm Outlook: Issued prior to a Winter Storm Watch. The Outlook is given when forecasters believe winter storm conditions are possible and are issued 48 to 60 hours in advance of a winter storm.

Blizzard Warning: Issued for sustained or gusty winds of 35 mph or more, and falling or blowing snow creating visibilities at or below 1/4 mile; these conditions should persist for at least three hours.

Wind Chill Warning: Issued in North Dakota when wind chill temperatures are expected to be 35 to 40 degrees below zero or colder.

Wind Chill Advisory: Issued in North Dakota when wind chill temperatures are expected to be 20 degrees below zero or colder.

Winter Weather Advisory: Issued for accumulations of snow, freezing rain, freezing drizzle, and sleet which will cause significant inconvenience and moderately dangerous conditions.

Dense Fog Advisory: Issued when fog will reduce visibility to 1/8 mile or less over a widespread area.

Snow Flurries: Light snow falling for short durations. No accumulation or light dusting is all that is expected.

Snow Showers: Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

Snow Squalls: Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant. Snow squalls are best known in the Great Lakes region.

Blowing Snow: Wind-driven snow that reduces visibility and causes significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground picked up by the wind.

Sleet: Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects. However, it can accumulate like snow and cause a hazard to motorists.

Freezing Rain: Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Even small accumulations of ice can cause a significant hazard.

<http://weather.gov>



Winter begins on

December 21, 2001 at 1:21 PM CST

Spring begins on

March 20, 2002 at 1:16 PM CST



A full list of free astronomical applications via the web can be found on the U.S. Naval Observatory homepage at: <http://aa.usno.navy.mil/data/>

Before a Winter Storm

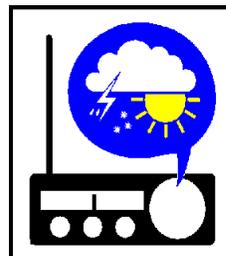
- ① Keep vehicles fueled and in good repair, with a winter emergency kit in each.
- ① Get a NOAA Weather Radio to monitor the developing storm.
- ① Know how to contact family and/or friends through a common out-of-state contact in the event you become separated.
- ① Be prepared to cancel travel plans.
- ① Ensure you have drinking water, first aid kit, no-cook food, non-electric can opener, radio, flashlight, and extra batteries.

During a Winter Storm

- ① Monitor your NOAA Weather Radio or local radio and/or TV station for information and emergency instructions.
- ① If you go outside for any reason, wear several layers of loose-fitting, lightweight, warm clothing rather than one layer of heavy clothing. Wear a hat. Cover your mouth with a scarf to protect your lungs from extremely cold air. Wear sturdy, waterproof boots.
- ① Conserve fuel, if necessary, by keeping your house cooler than normal. Temporarily shut off heat to less-used rooms.
- ① If using kerosene heaters, maintain ventilation to avoid build-up of toxic fumes. Keep heaters at least three feet from flammable objects. Refuel kerosene heaters outside.
- ① Avoid travel if possible. If you must travel, do so during daylight. Do not travel alone. Stay on main roads and keep others informed of your schedule.

After a Winter Storm

- ① Report downed power lines immediately.
- ① Check on neighbors, especially any who might need help.
- ① Check to see that no physical damage has occurred and that water pipes are functioning. Wait for streets and roads to be opened before you attempt to drive anywhere.
- ① Beware of overexertion and exhaustion. Shoveling snow in extreme cold causes many heart attacks. Set your priorities and pace yourself. The natural tendency is to do too much too soon.



NOAA Weather Radio Gets a New Voice

NOAA Weather Radio, the nation's automated radio weather warning system, will soon have a new voice. The National Weather Service (NWS) evaluated five voices and reviewed 19,000 Internet survey comments from the public in the effort to find the new voice.

NOAA has awarded Siemens Information and Communication Network of Boca Raton, Fla., a \$633,615 contract for the voice improvement. The weather service will begin implementation of the new voice's text-to-speech software program early in 2002, following successful testing and integration within the NOAA Weather Radio system.

NOAA Weather Radio, sometimes referred to as the voice of the National Weather Service, is a portable device that enables the public to receive continuous weather broadcasts and hazard alerts directly from local weather forecast offices. Transmitting from a network of 583 stations nationwide, the NOAA Weather Radio can be heard by more than 85 percent of the U.S. population.

The old and new voice can be heard on the NOAA Weather Radio Web site at:

<http://www.nws.noaa.gov/nwr/newvoice.htm>

NOAA Updates *Normal* Temperatures

Normal temperatures and precipitation levels for your area may have changed as the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC) recently released new normal data for about 8,000 weather stations. The data defines the normal temperature at locations across the United States, Puerto Rico, the Virgin Islands and U.S. Pacific Islands. These data are used as a benchmark for weather forecasters to calculate day-to-day temperature and rainfall departures from typical levels and are also used by business, government and industry for planning, design and operations.

The new figures, based from 1971 to 2000, are computed every ten years by NCDC in Asheville, North Carolina. The new normal temperature and precipitation levels will replace from 1961 to 1990 and includes data for 1275 more weather stations than the previous edition. NOAA's National Weather Service will begin using the new figures for daily and monthly climate reports in January 2002.

A climatological normal is the average temperature, precipitation, or degree days over a 30-year period for a specific location. These official stations meet quality standards prescribed by NOAA and the World Meteorological Organization.

Beginning October 1, 2001, customers may order the new normal files online by visiting NCDC's Online Store at: www.ncdc.noaa.gov

More information on the 1971-2000 normals is available at: www.ncdc.noaa.gov/normals.html

NCDC is a part of the National Environmental Satellite, Data, and Information Service (NESDIS), an agency of Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). NESDIS is the nation's primary source of space-based meteorological and climate data. NESDIS operates the nation's environmental satellites, which are used for weather forecasting and climate monitoring. NESDIS also operates three data centers, which house global data bases in weather, climate, and marine geology.

Online Meteorology Education & Training

A new online course titled *Anticipating Hazardous Weather and Community Risk* is available to you free of charge. This course is designed to give you a solid background in understanding hazardous weather and community risks so that you can communicate effectively with your local NWS office and your community.

You can now access the Hazardous Weather and Anticipating Community Risk course at:

<http://meted.ucar.edu/hazwx/index.htm>

Credit can be earned through FEMA's Emergency Management Institute at:

<http://www.fema.gov/emi/is271tst.htm>

Antarctica is the windiest and driest *continent* on the earth. Most people do not know that Antarctica is considered a polar desert because it receives an average of about 2 inches of water equivalent precipitation each year.

SKYWARN Recognition Day

December 1, 2001 from 00 to 24 UTC
(Nov 30 at 6 PM CST to Dec 1 at 6 PM CST)

SKYWARN Recognition Day for Amateur Radio Operators is cosponsored by the National Weather Service and the American Radio Relay League. The purpose of the event is to celebrate the contributions that amateur radio operators ("hams") make to the National Weather Service during times of critical weather. During the event, hams across the country try to contact as many NWS offices as possible using their radio equipment. The contacts are received and logged at the individual NWS offices by volunteer amateur radio operators. The National Weather Service will award a certificate with endorsements to give amateur radio operators something to shoot for. An endorsement is basically a sticker that is placed on the certificate if certain goals are reached. Visit <http://hamradio.noaa.gov> for more information.

Significant Changes to Future of EMWIN

The Emergency Managers Weather Information Network (EMWIN) was originally designed as a low cost method of disseminating weather related products directly from satellites to Emergency Managers. EMWIN remains a low cost system, but changes in satellite technology and international laws governing satellites will have significant impacts on its future. Beginning with the GOES-N satellite, currently scheduled to be launched in 2003, the EMWIN satellite signal will change drastically. Systems that currently receive the satellite signal will likely need some type of an upgrade to their system in order to retrieve the future signal. Fortunately, these changes will not take effect until mid 2003 at the earliest, but more likely 2004 or 2005 when the GOES- N satellite becomes operational.

To keep up to date on the status of the new EMWIN broadcast and changes needed in equipment, a special status message will be periodically updated by NWS headquarters. This message and more detailed EMWIN information can be found at:

<http://www.crh.noaa.gov/emwin>
<http://iwin.nws.noaa.gov/emwin/index.htm>
 Or Email: daniel.noah@noaa.gov

Keep ahead of the storm by listening to NOAA Weather Radio for the latest winter watches, warnings, and forecasts



Spring Flood Outlook

It is never too early to think about the spring flood season in North Dakota. Mark these dates on your calendar:

February 22, 2002: Narrative Flood Outlook

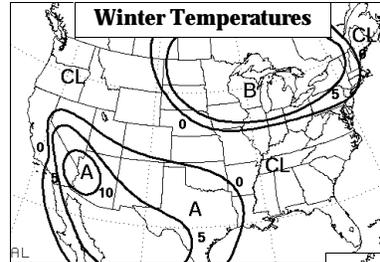
March 22, 2002: Numerical Flood Outlook

These products will be available on our internet homepage next spring.

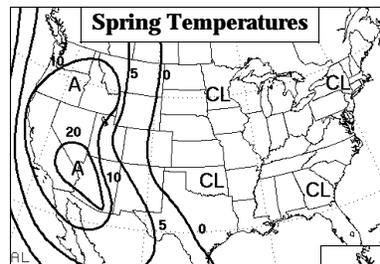
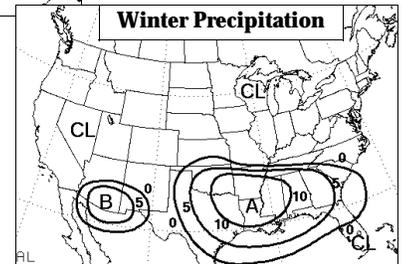
Official National Weather Service

Long Range Forecast

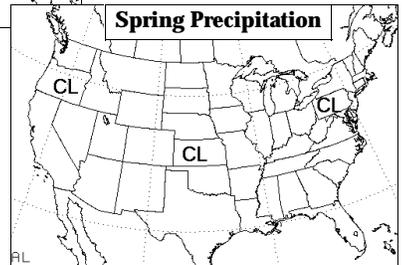
from the NWS Climate Prediction Center
 issued September 13, 2001



The North Dakota winter forecast for December, January, and February calls for below normal temperatures and normal precipitation.



The North Dakota spring forecast for March, April, and May of 2002 calls for normal temperatures and normal precipitation.



What do the above maps mean?

The maps show the likelihood of the occurrence of mean temperature or total precipitation varying from climatology during the target season.

MAP LEGEND

A = Above normal

B = Below normal

CL = Climatology

For the latest forecast check out the Climate Prediction Center homepage:

<http://www.cpc.ncep.noaa.gov>



Is your community StormReady?

Contact your
National Weather Service
or
Emergency Management Office

Weather safety information at
www.nws.noaa.gov/stormready

**Learn how to protect
your family during
severe winter weather!**

NWS Bismarck
www.crh.noaa.gov/bis

North Dakota
Emergency Management
www.state.nd.us/dem

For more information contact your local
National Weather Service or write: NWS, PO
Box 1016, Bismarck, ND 58502

U.S. Department of Commerce
National Oceanic and Atmospheric Administration

National Weather Service Forecast Office
P.O. Box 1016
Bismarck, ND 58502-1016

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Penalty for Private Use, \$300